REMARKS

Claims 14-27 are active in the case. Reconsideration is respectfully requested.

The present invention relates to a heat-insulating coating which comprises at least one layer of cholesteric IR-reflecting layers.

Invention

The discovery of the present invention is that it is possible to provide a heat insulating medium based on one or more cholesteric layers which is completely transparent to visible radiation and which absorbs very little in both in the near infrared and visible wavelengths. As such, the invention is directed to a heat-insulating coating, which comprises one or more non-micellar cholesteric layers, each reflecting at least 40 % of the incident radiation in the infrared wavelength range above 750 nm.

Prior Art Rejection

Claims 14, 16-21 and 23-27 previously on the record stands rejected based on 35 USC 102(b) as anticipated by Nippon Sheet Glass.

As stated by applicants previously on the record, it is well known to one of skill in the art who is familiar with the physical behavior of cholesteric layer material, that it is practically impossible for a specific cholesteric layer to reflect more than 50 % of incident radiation thereon of a specific wavelength. The reason for this is that because a cholesteric layer is composed of liquid crystalline material which forms a helical super structure of specific handedness, only a fraction of the light of a specific wavelength which is incident on a layer, i.e., a fraction with identical handedness, will be reflected by the cholesteric layer. Because normal stay incident

visible light consists of radiation of left-handedness and right-handedness, only 50 % of the incident light theoretically can be reflected. On a practical basis, however, the percentage of reflected light from such layers is significantly below the 50 % value.

In rejecting the claims in the Office Action of November 20, 2002, the Examiner has stated in his response to applicants' comments on the record that specific cholesteric layers cannot reflect more than 50 % of incident radiation on the layer, that applicants have not provided support for such knowledge. However, as applicants have stated previously, such knowledge is fundamental and well known. In order to document this fact, applicants hereby enclose portions of text from two U.S. Patents and Ullman's Encyclopedia of Industrial Chemistry which state the well known. Thus, at page 379, right column of volume A15 the 5th addition (1990), the text states:

> -- Only one polarization is reflected under the circumstances: a cholesteric liquid crystal with a right-handed helix reflects only right-handed polarized incident light, and left-handed polarized light passes through without hindrance. Moreover, the light is reflected as right-handed polarized ray, in contrast to ordinary surfaces which reverse the sense of circular polarization on reflection. If a cholesteric liquid crystal with a left-handed helix is used, the same phenomena occur with obvious changes of polarity. ---

Note the disclosure of the text at column 1, lines 31-39 of U. S. Patent 6,143,379:

> -- In selective reflection at the helical superstructure of the liquid-crystal polymers, only one polarization direction or light is reflected. In the case of a right-handed helix, for example, right-handed circular polarized light is reflected, while the left-handed circular polarized component is transmitted and,

> where appropriate, absorbed by the black substrate. This means that liquid-crystalline polymer films of this type can only reflect a maximum of 50 % of the incident light having the wavelength in question. --

Further, note the disclosure of the text at column 2, lines 31-39 of U. S. Patent 5,364,557:

> -- Unpolarized light 3 with wavelength $\lambda = \lambda_o$ incident on the film will interact with the helix structure and causes the reflection of 50 % of its intensity as right circularly polarized light 3a, and the other 50 % is transmitted as left circularly polarized light 3b. --

Clearly, the documentation provided and described above fully supports applicants' comments as to the reflection of light that is incident on the present heat-insulating coating.

Further in light of the comments presented above and considering the disclosure of Nippon Sheet Glass in light of the comments above, one of skill in the art will understand with respect to Fig. 1 of the reference that light of a specific handedness must have been used in the experiments yielding the data of Fig 1, because, for each of the three cholesteric polymer films, a reflectivity of about 75 % was observed, i. e., 83 % minus 8 %(which is the baseline of the spectrum shown). If the same cholesteric layers had been investigated with "normal light" consisting of equal proportions of left-handed and right-handed light, a reflectivity of 37.5 % would have been observed (75 % ÷ 2). On the other hand, however, the cholesteric layers of the coating of the present invention show significantly improved reflectivity per layer of at least 40 %. This is clear from the last paragraph of Example 1 on page 43 of the present specification which mentions that a cholesteric layer exhibits a reflection of 47 % of incident light. Moreover, by incorporating a $\lambda/2$ film in the heat-insulating coating, reflectivities of about 89 % (about 45 % per layer) can be obtained as described in Example 2 of the text. It is therefore clear that the

claimed heat-insulating coating of the present invention is not anticipated by the reference. Moreover, applicants submit that the disclosure of Nippon Glass would not motivate the skilled artisan to improve upon the reflectivity characteristics of the cholesteric films of the reference to achieve the level of effectiveness of the present invention.

As applicants also have previously pointed, Fig. 1 of the Nippon Glass reference clearly shows that the mid-peak width of the reflection peaks of the combination of three cholesteric films can be estimated to be less than 250 nm. This means that the mid-peak width of each film is significantly less than 83 nm because the three films produce peaks of almost identical geometry. In the present invention, however, the cholesteric layers prepared have a significantly wider mid-peak width. As is clear from Example 3 of the present specification, mid-peak widths of values as high as 121 nm can be achieved. This fact is important from the viewpoint of practicability because the number of cholesteric layers required to reflect a certain wavelength range can be further decreased which simplifies the preparation of heat-insulating coating compositions based on cholesteric polymer films.

In view of the comments above, withdrawal of the rejection previously on the record is respectfully requested.

Claim 15 stands previously rejected based on 35 USC 102(b) as anticipated by Nippon Sheet Glass.

Although the Nippon Sheet Glass reference teaches a transmissivity of at least 75 %, this reflectivity stands in the context of the actual IR light reflection which is achieved, which, as demonstrated above, is materially less than that achieved in the present invention as set forth in Claim 14. Accordingly, the reference does not anticipate Claim 15 and withdrawal of the rejection is respectfully requested.

Claim 22 stands previously rejected based on 35 USC 102(b) as anticipated by Nippon Sheet Glass in view of G. B Patent 2,132,623.

It is clear that the process of the present invention is dependent for its practice to have layers of the cholesteric material of present Claim 14 built into a heat-insulating structure. However, the present invention has been demonstrated to be distinct from the Nippon Glass Sheet reference on the basis of the cholesteric layers which make-up a heat-insulating coating. The British patent does not improve upon the Nippon Glass reference because it does not teach or suggest the characteristics of a heat-insulating coating based on the cholesteric layers described in Claim 14. Accordingly, withdrawal of the rejection is respectfully requested.

It is now believed that the application is in proper condition for consideration on its merits.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Norman F. Oblon
Attorney of Record
Registration No.: 24,618

Frederick D. Vastine, Ph.D.
Registration No.: 27,013

Customer Number
22850

TEL: 703-413-3000
FAX: 703-413-2220
NFO:FDV